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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/082,275	02/26/2002	A-Man Hung	MR1115-383	5355
4586	7590	02/12/2004	EXAMINER	
ROSENBERG, KLEIN & LEE 3458 ELLICOTT CENTER DRIVE-SUITE 101 ELLICOTT CITY, MD 21043			LEFLORE, LAUREL E	
			ART UNIT	PAPER NUMBER
			2673	2

DATE MAILED: 02/12/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/082,275

Applicant(s)

HUNG, A-MAN

Examiner

Laurel E LeFlore

Art Unit

2673

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 February 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). ____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____ 6) ☐ Other: ____

DETAILED ACTION

Drawings

1. The drawings are objected to because element 51 of figure 5 should be "Signal Conversion Device" instead of "Singnal Conversion Device". A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1 and 3 are rejected under 35 U.S.C. 102(b) as being anticipated by Tsunekumi et al. 4,712,100.

In regard to claim 1, Tsunekumi et al. discloses an optic tracking device for controlling a cursor of a computer display. See figure 1 and column 2, lines 28-32, disclosing, "Fig. 1 is a perspective view showing an outside appearance of the coordinate inputting apparatus...This apparatus can be used as an input section of...a personal computer or the like." See column 1, lines 8-15, disclosing that the invention is an optic tracking device.

Tsunekumi further discloses a pad having a surface on which a number of light reflective zones are formed and spaced from each other by light absorbing

zones and a body movable on the surface of the pad, the body having a bottom positioned on the surface of the pad and defining a cavity. See figures 1 and 2. Also see column 2, lines 35-30, disclosing, "4 is an operating section which can be manually freely moved on the information plate 1 and which optically detects a pattern on the plate". Thus, information plate 1 is a pad and operating section 4 is a body movable on the surface of the pad. Lines 33-35 of column 2 further disclose that on information plate 1, "a plurality of white circles 3 are written like a matrix on a black surface 2". It is inherent that the white circles are light reflective zones, as white is a light reflective color, and the black surface is light absorbing zones, as black is a light absorbing color. Further see figure 3, depicting the cavity of operating section 4.

Tsunekumi further discloses, in lines 6-45 of column 3, a light emitting element adapted to project a light onto the pad whereby the light is selectively reflected by the light reflective zones and absorbed by the light absorbing zones. See figure 3 and column 3, lines 15-20, disclosing, "Light emitting sections 5, 9 and 6 provided in the operating section 4 serve to illuminate the luminous flux onto the information plate 1...Or, a single light emitting device may be used". Further see lines 33-45 of column 3, disclosing the light being reflected from the white circles (element 3, also shown in figure 2) and absorbed by the black surface 2.

Tsunekuni further discloses an optic sensor received in the cavity, the optic sensor comprising a number of photo transistors arranged in a

predetermined pattern for detecting an optic signal caused by the reflected light in different directions and each generating a primary electrical signal corresponding to the detection. See figure 3 and column 3, lines 25-28, disclosing, "Numerals 10, 14 and 11 denote light receiving sections to detect the luminous flux reflected by the information plate 1...phototransistors...may be used as light receiving sections." Further see figure 4 depicting a predetermined pattern of the phototransistors, which is disclosed in column 3, lines 46-65. Further see column 4, lines 18-21, disclosing that when "operating section 4 is moved over the information plate 1, characteristic detection signals are generated from the respective optical systems". Again see column 3, lines 46-65, disclosing that these respective optical systems are the predetermined pattern of phototransistors and figure 4 depicting the light reflected in different directions.

Tsunekuni further discloses a signal processing circuit, depicted in figure 5, having input terminals respectively connected to the photo transistors to receive the primary electrical signals of the photo transistors, the primary electrical signals being processed by the signal processing circuit to generate an output signal indicating moving speed and direction of the body with respect to the pad. See column 4, lines 40-44, disclosing, "Signals VI and Vr which are outputted from the light receiving sections 10 and 11...are respectively inputted to positive and negative input terminals of a differential amplifying circuit 15."

Further see elements 20-23 of figure 5, depicting moving speed and direction detection.

4. In regard to claim 3, Tsunekuni discloses that the light emitting element comprises a light emitting diode. See rejection of claim 1 and column 3, lines 17-19, disclosing, "For instance, light emitting devices such as LEDs...may be used as light sources."

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsunekuni et al. 4,712,100 in view of Gordon et al. 2002/0093486 A1.

In regard to claim 2, Tsunekuni discloses an invention similar to that which is disclosed in claim 2 of the immediate invention. See rejection of claim 1 for similarities. Tsunekuni does not disclose that the optic sensor comprises a transparent casing encasing the photo transistors.

Gordon et al. discloses on page 4, in paragraph [0027], referring to figure 1, "Although it has been omitted for clarity, the orifice 13 might include a window that is transparent for the light from LED2, and which would serve to keep dust, dirt or other contamination out of the innards of the seeing eye mouse." See

figure 1, depicting the array of phototransistors 10 is within this orifice and is thus encased by the window.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Tsunekuni by including the transparent "window" casing of Gordon. One would have been motivated to make such a change based on the teaching of Gordon that such a casing "would serve to keep dust, dirt or other contamination out of the innards" of the optical input apparatus.

7. Claims 4, 5, 6, 8 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tsunekuni et al. 4,712,100 in view of Ebina et al 5,943,233 and further in view of the Hutchison Encyclopedia "microprocessor" description.

In regard to claim 4, Tsunekuni discloses an invention similar to that which is claimed in claim 4. See rejection of claim 1 for similarities. Tsunekuni further discloses that the signal processing circuit comprises a signal conversion circuit connected to each photo transistor to receive the primary electrical signal and generate a secondary electrical signal. See figure 5, depicting the primary electrical signal outputs of each phototransistor A-E connected to elements 15 or 16 and waveform shaping circuits from which are the secondary electrical signal outputs V'x, V'm and V'y. The conversion process is further disclosed in column 4, line 37 to column 5, line 15.

Tsunekuni does not disclose a microprocessor. However, Tsunekuni does disclose movement quantity and detector circuits (figure 5, elements 20-23) to

which the secondary electrical signals are applied and an output terminal, the movement quantity and detector circuits performing a predetermined operation to process the secondary electrical signals for generation of an output signal that indicates the moving speed and direction of the movable body at the output terminals thereof. For a description of the predetermined operations, see column 5, lines 48-67.

Ebina discloses a computer input device with an optical sensor in which a microprocessor is used. See figure 33 and column 25, lines 5-12, disclosing, "the input device 600 further includes a control circuit 652, which detects the displacement of the movable body 620 based on the output of the light receiving element 622, and outputs the detected results as information for shifting a cursor 651 or an icon on a display 650 of a computer or the like. The control circuit 652 includes...a microcomputer or a control IC".

Further in the description of a microprocessor in the Hutchison Encyclopedia, as presented on the website tiscali.reference, it is disclosed, "The microprocessor has led to a dramatic fall in the size and cost of computers".

It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the inventions of Tsunekuni and Ebina, thus having an optic tracking device in which the signal processing circuit comprises: a signal conversion circuit connected to each photo transistor to receive the primary electrical signal and generating a secondary electrical signal; and a microprocessor having input terminals to which the secondary electrical signals

are applied and an output terminal, the microprocessor performing a predetermined operation to process the secondary electrical signals for generation of an output signal that indicates the moving speed and direction of the movable body at the output terminal thereof. One would have been motivated to use the microprocessor of the Ebina invention in the invention of Tsunekuni based on the teaching of the Hutchinson Encyclopedia, as presented on the website tiscali.reference, that use of a microprocessor can lead to a dramatic fall in size and cost. Also, the Ebina and Tsunekuni reference are both optical input devices with many common components and combining or substituting components among the two inventions would be obvious. Further using a microprocessor is common and conventional in order to reduce cost and size of an invention.

8. In regard to claim 10, see rejection of claim 4. Also note the LED driving circuit 657 in figure 33 and see column 25, lines 5 to 15, disclosing that "control circuit 652 includes, in addition to a microcomputer or a control IC...a driving circuit 657 for driving the light emitting element 621. Thus, the driving of the LED is part of the microprocessor circuit and Tsunekumi in view of Ebina, and further in view of the Hutchinson Encyclopedia description of "microprocessor" discloses that the microprocessor has an additional output terminal to which the light emitting element is connected for controlling actuation of the light emitting element.

9. In regard to claim 6, Tsunekumi in view of Ebina, and further in view of the Hutchinson Encyclopedia description of "microprocessor" discloses an invention similar to that which is claimed in claim 6. See rejection of claim 4 for similarities.

Ebina further discloses that the signal conversion circuit comprises first and second operational amplifiers having first and second positive input terminals connected to the photo transistor to receive the primary electrical signal, the first operational amplifier having a first negative input terminal coupled to a first output terminal thereof for generation of a delayed reference signal at the first output terminal, the second operational amplifier having a second negative input terminal coupled to the first output terminal to receive the delayed reference signal and a second output terminal for generation of the secondary electrical signal based on comparison between the primary electrical signal and the delayed reference signal. This configuration is depicted in figure 34.

10. In regard to claims 5 and 8, see rejections of claims 4 and 6. Tsunekuni further discloses that each secondary electrical signal comprises a series of square waves. See figures 5 and 6b and column 5, lines 11-15, disclosing, "[primary] signals V_x , V_y and V_m are respectively supplied to the waveform shaping circuits 17, 18 and 19, so that square wave signal V_x' , V_y' and V_m' are derived."

11. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsunekuni et al. 4,712,100 in view of Ebina et al 5,943,233 and further in view of the Hutchison Encyclopedia "microprocessor" description as applied to claims 4

and 6 above, and further in view of Analog Dialogue article, "Curing Comparator Instability with Hysteresis" by Reza Moghimi.

In regard to claim 7, Tsunekuni in view of Ebina and further in view of the Hutchison Encyclopedia "microprocessor" description discloses an invention similar to that which is disclosed in claim 7 of the immediate invention. See rejections of claims 1, 4 and 6 for similarities. Further see figure 5 and column 5, lines 11-12 of Tsunekuni, disclosing, "Numerals 17 and 19 denote waveform shaping circuits having hysteresis characteristics.

Tsunekuni in view of Ebina and further in view of the Hutchison Encyclopedia "microprocessor" description does not disclose that each operational amplifier has hysteresis characteristics of the output terminal with respect to the positive input terminal thereof.

Moghimi discloses such characteristics in such arrangements of operational amplifiers in the article "Curing Comparator Instability with Hysteresis". Moghimi further teaches such a method in order to reduce noise in a comparator and cure instability.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Tsunekuni in view of Ebina and further in view of the Hutchison Encyclopedia "microprocessor" description by having each operational amplifier have hysteresis characteristics of the output terminal with respect to the positive input terminal thereof. One would have been

motivated to make such a change based on Moghimi's teaching that such a change will cure comparator instability and reduce noise

12. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Tsunekuni et al. 4,712,100 in view of Ebina et al 5,943,233 and further in view of the Hutchison Encyclopedia "microprocessor" description as applied to claim 6 above, and further in view of Clayton 5,977,533.

In regard to claim 9, Tsunekuni in view of Ebina and further in view of the Hutchison Encyclopedia "microprocessor" description disclose an invention similar to that which is claimed in claim 9. See rejection of claim 6 for similarities. Tsunekuni in view of Ebina and further in view of the Hutchison Encyclopedia "microprocessor" description do not disclose a current-limiting resistor adapted to be connected between the photo transistor and a power source for limiting electrical current flowing through the photo transistor. Further, they are mute on the subject of connecting the phototransistor to a power supply.

Clayton discloses (see figure 2 and column 1, lines 38-49) that the "conventional notch sensor circuit 28 includes a photodiode PD1 and phototransistor PQ1 that may be included in a common package...An anode terminal of the photodiode PD1 and a collector terminal of the phototransistor PQ1 are each coupled to a voltage source PV+ which provides a direct current voltage, through resistors PR1 and PR4, respectively." Thus, Clayton discloses that such connection of a resistor between a phototransistor and power source is conventional.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Tsunekuni in view of Ebina and further in view of the Hutchison Encyclopedia "microprocessor" description by adding the resistor between the phototransistor and the power supply in order to limit electrical current flowing through the phototransistor. One would have been motivated to make such a change based on the teaching of Clayton that such a configuration is conventional. Further, current limiting resistors are conventional and necessary in the connection of many electrical components, particularly with power supplies, and are an inherent component in the circuits of most inventions.

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Liou 5,086,197 discloses an optical tracking device with a grid and phototransistors.

Dandliker et al. 5,907,152 discloses a pointing device utilizing a photodetector array.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Laurel E LeFlore whose telephone number is (703) 305-8627. The examiner can normally be reached on Monday-Friday 8-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Mancuso can be reached on (703) 305-3885. The fax phone

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number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

LEL

A handwritten signature in black ink, consisting of a large, stylized 'L' followed by a diagonal stroke and a horizontal line.